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February 3, 2003

FILED ELECTRONICALLY

Marlene H. Dortch
Secretary
Federal Communications Commission
445 Twelfth Street, S.W., Room TW-A325
Washington, D.C. 20554

Re: ***Ex Parte***
In the Matter of Revision of Part 15 of the Commission's Rules Regarding Ultra-Wideband Transmission Systems, ET Docket No. 98-153, February 14, 2002

Dear Ms. Dortch:

This *ex parte* reports that on January 31, 2003, Kalpak Gude and Harry Ng of PanAmSat Corporation ("PanAmSat"), Nancy Eskenazi (via telephone) of SES Americom, Inc. and the undersigned counsel, representing PanAmSat, met with Richard Engelman, John Martin and Robert Nelson of the International Bureau. The points covered in the meeting are reflected in the attached materials.

Respectfully submitted,

/s/ Joseph A. Godles
Joseph A. Godles
Attorney for PanAmSat Corporation

Attachments
Cc: Richard Engelman
John Martin
Robert Nelson

Satellite Industry Association

Deployment of Ultra-WideBand (UWB) Devices near a C-band Receiving Earth Stations

January 31, 2003

Ultra-WideBand Devices

FCC adopted the First Report and Order (ET Docket 98-153) regarding ultra-wideband (UWB) devices under Part-15 regulation on February 14, 2002. This Part-15 regulation permits, without license from the Commission, the marketing and operation of certain types of new products incorporating low power UWB technology.

UWB devices operate by employing very short duration pulses, in nanoseconds, that result in very wideband emission bandwidths, in GHz. The regulation limits the 10-dB emission bandwidth to not less than 500 MHz.

UWB technology is radically different from the traditional “carrier” signal types, such as AM, FM and PM. UWB communication employs pulse detection technology. Hence, various terms have been used to describe UWB communication mode – carrierless, nonsinusoidal and impulse based.

FCC regulation specifies that UWB devices must not exceed an average field strength of 500 uV/m at 3 meters in a 1 MHz reference bandwidth or an average EIRP density of -41.3 dBm/MHz in the 3.1 - 10.6 GHz band. The regulation also limits the peak EIRP density to 0 dBm/50 MHz..

The UWB devices may be used for ground-penetration radar system, medical imaging system, wall imaging system, surveillance system, and indoor and outdoor communication systems.

UWB device is an intentional radiator, that is, its emission occupies the whole C-band spectrum where as other Part 15 devices are unintentional (incidental) radiators, that is only spurious emission is permitted in the C-band.

Assumptions used in the Analysis

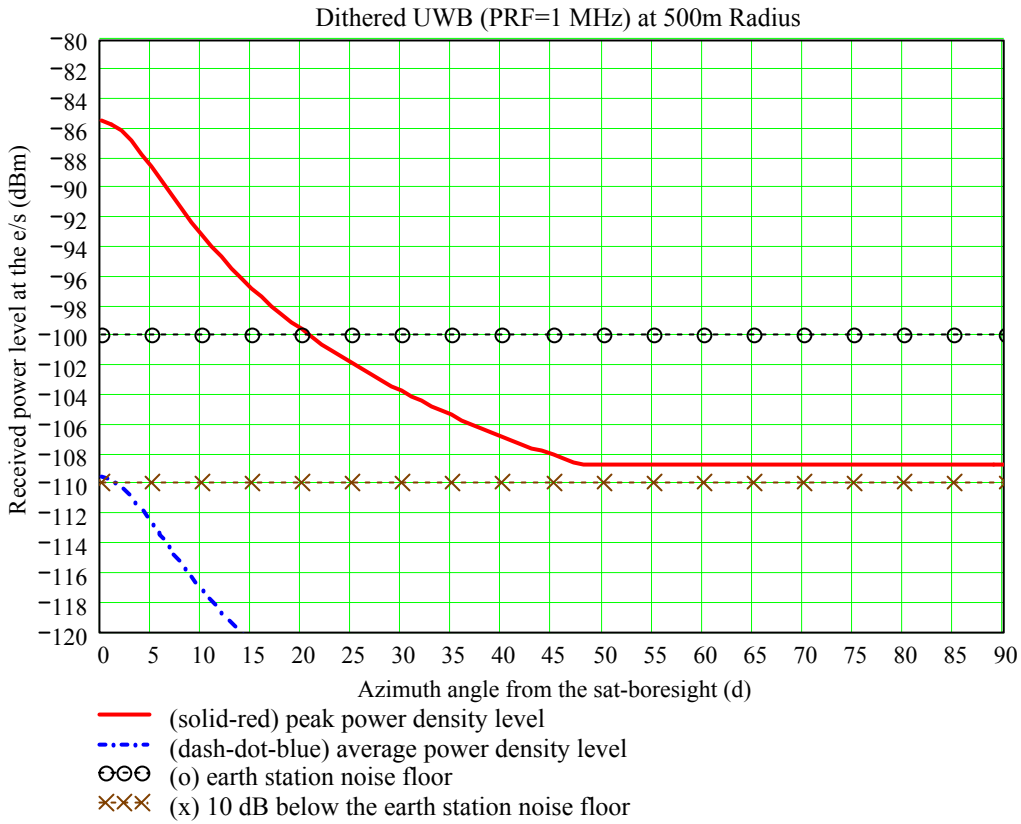
Receiving earth station

IF bandwidth	50 MHz
Reference bandwidth	1 MHz
Antenna elevation angle	5, 10 and 15 degrees
System noise temperature	149k @ 5-deg; 134k @10-deg; 124k @ 15-deg
Receiving system noise floor	-99.9 dBm@5-deg; -100.3 dBm@10-deg; -100.7 dBm @15-deg
Antenna sidelobe performance	32 - 25Log(θ) dBi $1 < \theta < 48$
	-10 dBi $48 < \theta < 180$
Antenna center-line height	7.5 m

UWB device

Peak EIRP density	0 dBm/50 MHz
Average EIRP density	-41.3 dBm/MHz
Pulse repetition frequency (PRF)	0.1 MHz to 50 MHz
Pulse-width modulation	non-dithered or dithered
Operating frequency	3700 - 4200 MHz
Device height above ground	1.5 m

References: FCC First Report and Order FCC 02-48 and NTIA Special Publication 01-43



An Example of the Expected Received Signal Level at an Earth Station Due to a UWB Device Moving Around the Earth Station at a Constant Radius of 500 meters and Radiating a Peak EIRP Density Level of –0.3 dBm/50MHz and the Average EIRP Density Level of –41.3 dBm/MHz

The Received Signal Level equal to the Earth Station Noise Floor

Earth station antenna elevation angle(deg)	UWB PRF (MHz)	Separation Distance between One Outdoor UWB Device And a Receiving Earth Station			
		Non-dithered		Dithered	
		for average power density level	for peak power density level	for average power density level	for peak power density Level
5	0.1 [4]		2.4 km		2.4 km
10			1.35 km		1.35 km
15			850 m		850 m
5	1.0 [5]	100 m	2.35 km	100 m	2.35 km
10			1.35 km		1.35 km
15			830 m		830 m
5	10 [6]		220 m	100 m	900 m
10			90 m		380 m
15			55 m		240 m
5	50 [7]			100 m	520 m
10					230 m
15					140 m

Notes:

1. The height of the UWB device is 1.5 meters above the ground level.
2. The height of the earth station antenna centerline is 7.5 meters above the ground level
3. The earth station receiver noise floor is:
   -99.9 dBm/50 MHz at 5 degrees elevation angle
   -100.3 dBm/50 MHz at 10 degrees elevation angle;
   -100.7 dBm/50 MHz at 15 degrees elevation angle.
4. For non-dithered case, the average power density = – 51.0 dBm/MHz and the peak power density = 0 dBm/50MHz. For dithered case, the average power density = – 51.0 dBm/MHz and the peak power density = 0 dBm/50MHz.
5. For non-dithered case, the average power density = – 41.3 dBm/MHz and the peak power density = - 0.3 dBm/50MHz. For dithered case, the average power density = – 41.3 dBm/MHz and the peak power density = - 0.3 dBm/50MHz.
6. For non-dithered case, the average power density = – 41.3 dBm/MHz and the peak power density = - 20.3 dBm/50MHz. For dithered case, the average power density = – 41.3 dBm/MHz and the peak power density = - 10.3 dBm/50MHz.
7. For non-dithered case, the average power density = – 41.3 dBm/MHz and the peak power density = - 34.4 dBm/50MHz. For dithered case, the average power density = – 41.3 dBm/MHz and the peak power density = - 14.3 dBm/50MHz.

The Received Signal Level is 10 dB below the Earth Station Noise Floor

Earth station antenna elevation angle (deg)	UWB PRF (MHz)	Separation Distance between One Outdoor UWB Device And a Receiving Earth Station			
		Non-dithered		Dithered	
		for average power density level	for peak power density level	for average power density level	for peak power density level
5	0.1 [4]	110 m	4.4 km	100 m	4.4 km
10			2.9 km		2.9 km
15			2.3 km		2.3 km
5	1.0 [5]	520 m	4.4 km	500 m	4.4 km
10		230 m	2.9 km	230 m	2.9 km
15		140 m	2.3 km	140 m	2.3 km
5	10 [6]	100 m	850 m	520 m	2.4 km
10			380 m	230 m	1.3 km
15			240 m	140 m	820 m
5	50 [7]		100 m	520 m	1.9 km
10				230 m	820 m
15				140 m	500 m

Notes:

1. The height of the UWB device is 1.5 meters above the ground level.
2. The height of the earth station antenna centerline is 7.5 meters above the ground level.
3. The received signal level at the earth station is equal to:
   - 109.9 dBm/50MHz at 5 degrees elevation angle
   - 110.3 dBm/50 MHz at 10 degrees elevation angle
   - 110.7 dBM/50 MHz at 15 degrees elevation angle

4. For non-dithered case, the average power density = - 51.0 dBm/MHz and the peak power density = 0.0 dBm/50MHz. For dithered case, the average power density = - 51.0 dBm/MHz and the peak power density = 0.0 dBm/50MHz.
5. For non-dithered case, the average power density = - 41.3 dBm/MHz and the peak power density = - 0.3 dBm/50MHz. For dithered case, the average power density = - 41.3 dBm/MHz and the peak power density = - 0.3 dBm/50MHz.
6. For non-dithered case, the average power density = - 41.3 dBm/MHz and the peak power density = - 20.3 dBm/50MHz. For dithered case, the average power density = - 41.3 dBm/MHz and the peak power density = - 10.3 dBm/50MHz.
7. For non-dithered case, the average power density = - 41.3 dBm/MHz and the peak power density = -34.3 dBm/50MHz. For dithered case, the average power density = - 41.3 dBm/MHz and the peak power density = - 14.3 dBm/50MHz.

Conclusion

1. UWB devices, both dithered and non-dithered, operating in the C-band would cause harmful interference to the earth stations.

2. Harmful interference occurs in every transponder across the 500 MHz band, 3700-4200 MHz.

3. Harmful interference only occurs during the short pulse interval, that is, during the peak pulse period, in nanoseconds. If multipath phenomenon is taking into account, the effective harmful interference interval could be many times the actual UWB peak-pulse interval.

4. The aggregate interference is time additive for low PRF (e.g., 1 MHz), and time and power additive for high PRF (e.g., 100 MHz).

5. The UWB interference zone is primarily in front of the earth station antenna in the direction where the antenna is pointing.

6. The NTIA Special Report also concluded that there is unacceptable interference from UWB into receiving earth stations. More importantly, the FCC statement of "With appropriate technical standards, UWB devices can operate using spectrum occupied by existing radio services without causing interference." is incorrect for the C-band.

7. It seems that FCC only considered the effect of the average power in the development of the UWB regulation and ignored the effect of peak power on the receiving earth stations

8. The following are possible options to allow UWB and C-band receiving earth stations to co-exist in the same environment:

- to vacate the use of UWB in the 3700-4200 MHz band or
- to limit the PRF to high rate and to reduce the peak-EIRP level.

SIA SATELLITE INDUSTRY ASSOCIATION